

Seat No.	
-------------	--

[4918]-301

T.Y. B.Sc. (III Sem.) EXAMINATION, 2016

COMPUTER SCIENCE

Paper I

CS-331 : Systems Programming

(2013 PATTERN)

Time : Two Hours

Maximum Marks : 40

- N.B. :— (i) All questions are compulsory.
(ii) All questions carry equal marks.
(iii) Figures to the right indicate full marks.
(iv) Neat diagrams must be drawn wherever necessary.

1. Attempt *all* of the following : [10×1=10]

- (a) Draw the schematic of pure and impure interpreter.
- (b) "Debuggers are used for executing program." Justify T/F.
- (c) List any *two* system calls supported for communication.
- (d) State use of Table of Incomplete Instruction (TII). Write fields of TII.
- (e) List the different types of editors.
- (f) What are different ways to implement constants in an assembly language ?
- (g) List *two* advantages of distributed operating system.
- (h) Write the purpose of BC statement. Give its syntax.
- (i) What do you mean by macro expansion ?
- (j) Name the different steps involved in program execution.

2. Attempt any *two* of the following :

(a) Explain in brief debugging function capabilities.

(b) Define the terms :

(i) — (i) Loader

(i) — (ii) Operating system

(iii) Command interpreter

(i) — (iv) System programming

(i) — (v) Linking.

(c) Consider the following assembly language program :

START 100
A DS 1
L1 READ A
READ B
MOVER AREG, A
SUB AREG, B
MOVEM AREG, C
PRINT C
STOP
B DS 2
C DS 1
END

- (i) Show the contents of symbol table and opcode table.
 (ii) Construct intermediate code forms using Var-I and Var-II.

Attempt any *two* of the following :

[2×5=10]

- (a) Compare single pass and multipass translation with the help of various factors.
- (b) Define binding. Differentiate between static and dynamic binding.
- (c) Consider the following macro :

	MACRO	
	DECR	&X, ®, =AREG, &N
	LCL	&M
&M	SET	O
	MOVER	®, =O'
MORE	MOVEM	®, &X+&M
&M	SET	&M+1
	AIF	(&MNEN). More
	MEND	

Show the contents of the following data structures :

- (i) MNT
- (ii) MDT
- (iii) PNTAB
- (iv) KPdTAb
- (v) EVNtab.

4. Attempt either (A) or (B) :

- (A) (a) What is role of assembler directives in assembly program ? Explain origin and EQU. [4]
(b) Define macro. Explain expansion time statements. [4]
② — (c) Explain word processor as an editor. [2]

Or

- (B) (a) Explain client-server computing. [4]
(b) Write advantages and disadvantages of *p-code* compiler. [4]
(c) Define device drivers. Give examples. [2]

Total No. of Questions—4]

[Total No. of Printed Pages—4

Seat No.	
-------------	--

[5018]-301

T.Y. B.Sc. (III Semester) EXAMINATION, 2016

COMPUTER SCIENCE

Paper I

(CS-331 : Systems Programming)

(2013 PATTERN)

Time : Two Hours

Maximum Marks : 40

N.B. :— (i) All questions are compulsory.

(ii) Figures to the right indicate full marks.

(iii) Neat diagrams must be drawn wherever necessary.

1. Attempt all :

[10×1=10]

- (a) Write any *four* elements of programming environment.
- (b) What are the different modes of line editor ?
- (c) Give the syntax of assembly language directive EQU and use of EQU.
- (d) What is the meaning of the following statement in assembly language ?

TEN DS 10

- (e) What is nested macro call ?

P.T.O.

- (f) Give any *two* differences between compiler and interpreter.
- (g) What is impure interpreter ?
- (h) Relocation factor is always positive value. True or False. Justify.
- (i) What is loosely coupled system ?
- (j) What is System Call ?

2. Attempt any *two* :

[2x5=10]

- (a) For the following code show the contents of Symbol Table,

Literal Table and Pool Table :

```

START 500
MOVER AREG, = '25'
SUB AREG, K
JMP1 : MULT AREG, = '81'
ORIGIN 300
LORG
ORIGIN 503
LOOP1 : MOVER CREG, COUNT
ADD CREG, = '1'
MOVEM CREG, COUNT
ADD AREG, COUNT
SUB AREG, = '7'
MOVEM AREG, SUM
BC ANY, LOOP1

```

```

PRINT SUM
STOP
A DS 1
K DS 1
COUNT DS 1
SUM DS 1
END

```

- (b) Explain in brief the pass structure of Macro Assembler.
- (c) Write a brief note on Distributed Systems and Real time embedded system.

3. Attempt any two :

[2×5=10]

- (a) Differentiate between Variant I and Variant II intermediate code forms of assembler.
- (b) Consider the following macro :

```

MACRO
COMPUTE &X, &Y, &OP = DIV, &LABEL =
&LABEL MOVER AREG, &X
&OP AREG, &Y
MOVEM AREG, &X
MEND

```

If the macro is called as :

COMPUTE M, N, LABEL = JMP then show the contents of APTAB, PNTAB, SSNTAB, KPDTAB and MNT.

- (c) What is a Loader ? What are the different types of loaders ?

4. Attempt either (A) or (B) :

- (a) Explain different types of Editors. [4]
(b) Explain Two-Pass Assembler. [3]
(c) Explain object file format-a.out [3]

Or

- (a) Which are the advantages of DDD over GDB ? [4]
(b) List the functions of Editor. Explain any *two*. [3]
(c) Explain Multiprocessor System. [3]

Seat No.	14653
-------------	-------

[5116]-401

T.Y. B.Sc. (Fourth Semester) EXAMINATION, 2017

COMPUTER SCIENCE

Paper II

(CS-341 : System Prog. and Operating Systems)

(2013 PATTERN)

Time : Two Hours

Maximum Marks : 40

- N.B. :— (i) All questions are compulsory.
(ii) All questions carry equal marks.
(iii) Neat diagrams must be drawn wherever necessary.

1. Attempt *all* of the following : [10×1=10]
- (a) List any *four* file attributes.
 - (b) What is role of valid and invalid bit in demand paging ?
 - (c) Define Reentrant code.
 - (d) State *two* benefits of multi-threaded programming.
 - (e) What is Aging ?
 - (f) "Counting semaphore can be implemented by using binary semaphore." True/False Justify.
 - (g) What is race condition ?
 - (h) Define Starvation.
 - (i) List *two* benefits of virtual machine.
 - (j) What is the main function of microkernels ?

P.T.O.

2. Attempt any two of the following :

[2×5=10]

- (a) What is process ? State and explain in brief different types of process states.
- (b) Consider the following snapshot of the system :

Process	Burst Time	Arrival Time	Priority
P ₁	10	0	3
P ₂	5	4	0 (high)
P ₃	2	3	1
P ₄	16	5	2
P ₅	8	2	4 (low)

Schedule the above set of processes according to :

- (i) Non-preemptive priority scheduling algorithm.
- (ii) FCFS.

Draw proper Gantt chart and find average turn around time and average waiting time.

- (c) Consider the following snapshot of the system :

	Allocation		
	A	B	C
P ₀	0	1	0
P ₁	2	0	0
P ₂	3	0	2
P ₃	2	1	1
P ₄	0	0	2

Max		
A	B	C
7	5	3
3	2	2
9	0	2
2	2	2
4	3	3

Available		
A	B	C
3	3	2

[5116]-401

Answer the following using Banker's algorithm :

- (i) What is content of Need Matrix ?
- (ii) Is the system in a safe state ?

3. Attempt any *two* of the following :

[2×5=10]

(a) Consider page reference string as follows :

1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 3

Assume 3 frames. Find the number of page faults according to :

- (i) FIFO page replacement algorithm
 - (ii) LRU page replacement algorithm.
- (b) What is deadlock ? Explain deadlock prevention strategies.
- (c) What is critical section problem ? Explain two general approaches to handle critical section in operating system.

4. Attempt any *one* (A or B) :

[1×10=10]

(A) (a) Consider the following segment table :

Segment	Base	Length
0	363	500
1	1272	20
2	1675	1500
3	986	240
4	211	130

[5116]-401

What are Physical addresses for the following Logical addresses ?

(i) 0,425

(ii) 2,500

(iii) 1,150

(iv) 3,285.

[4]

(b) What is external fragmentation ? What are various ways to avoid external fragmentation ? [4]

(c) Explain any *two* benefits of multithreaded programming. [2]

Or

(B) (a) Explain tree structured directories along with advantages and disadvantages. [4]

(b) Explain multilevel feedback queue scheduling with diagram. [4]

(c) What is a wait-for-graph ? [2]

Total No. of Questions—4]

[Total No. of Printed Pages—4

Seat No.	
-------------	--

[5116]-301

T.Y. B.Sc. (Third Semester) EXAMINATION, 2017

COMPUTER SCIENCE

Paper I

(CS-331 Systems Programming)

(2013 PATTERN)

Time : Two Hours

Maximum Marks : 40

N.B. :— (i) All questions are compulsory.

(ii) Figures to right indicate full marks.

(iii) Neat diagrams must be drawn wherever necessary.

1. Attempt All :

[1×10=10]

- (1) What is expansion time variable ?
- (2) What do you mean by cache memory ?
- (3) Which are the contents of macro definition ?
- (4) Write any two system calls used for process control on UNIX.
- (5) "Interpreter can generate a code during interpretation." State true or false.
- (6) Write tasks performed by operating system under memory management.
- (7) Give any two advantages of p-code compiler.

P.T.O.

- (8) What is the meaning of the following statement in assembly language ?

TEN DC 10

- (9) "Compiler converts assembly language program into LLL." State true or false.
- (10) Write types of editor.

2. Attempt any two :

[2×5=10]

- (a) Generate intermediate code variant I and variant II for the following assembly language program.

Assume standard codes for mnemonics, declarative statements register and directive statements :

```
START      200
READ       A
READ       B
MOVER      AREG = '4'
ADD        AREG B
MOVER      BREG A
SUB        BREG A
MOVEM      BREG C
PRINT      C
STOP
A DS 1
B DS 1
C DS 1
END
```

- (b) Explain semantic macro expansion with example.
- (c) Explain various components of object module with example.

3. Attempt any *two* : [2×5=10]

- (a) What is operating system ? Write functions of operating system.
- (b) What is forward reference problem ? How is it handled in one pass assembler ?
- (c) Explain different data structure used in design of a macro-preprocessor.

4. Attempt either A or B :

- (A)
- (a) What is editor ? Write need of editor. [4]
 - (b) Explain command interpreter. [3]
 - (c) Give the usage of each of the following statement with its syntax : [3]
 - (i) LCL
 - (ii) SET
 - (iii) ANOP.

(B) (a) Explain functions and capabilities of debugger. [4]

(b) Which are different types of assembly language statement ?

Explain with an example. [3]

(c) Define : [3]

(i) Loader

(ii) Translated origin

(iii) Address sensitive instruction